Screen-printed thick-films : from materials to functional devices

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Abstract

The aim of the present paper is to demonstrate that the existence of a bulky sintered material, with the required properties for a potential application (called hereafter active material), does not necessarily mean a straightforward manufacturing of a corresponding functional planar thick-film device with the required properties. Many problems can be solved at the level of each element of the micro-assembly, namely the substrate, the electrodes, the heating resistor, and of course the active material. The properties of the thick film sometimes appear totally different from those of the active bulky material, and can be advantageously exploited. In some cases, physico-chemical interactions concern the whole micro-assembly and not only one or two elements, as certainly does any reliability approach. Examples drawn from our own experience in the area, deal with super-thick copper pads, varistors, PZT-based pyroelectric sensors, semiconductor oxide gas sensors, zirconia oxygen sensors